M2401G 24 Port 20Gb/s InfiniBand Switch for the Dell M1000e Chassis User Manual

Rev 1.0

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M2401G 24 Port 20Gb/s InfiniBand Switch

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About this Manual

This manual describes the electrical and physical specifications of Mellanox Technologies' M2401G 24 Port 20Gb/s InfiniBand Switch for the Dell M1000e Chassis.

Intended Audience

This manual is intended for users and system administrators responsible for installing and setting up the switch platforms listed above.

The manual assumes familiarity with the InfiniBand® Architecture Specification.

Related Documentation

The documentation set accompanying the Mellanox M2401G includes the following:

Table 1 - Reference Documents

InfiniBand Architecture Specification Volume 1 Release 1.2.1 and Volume 2 release 1.2.1	InfiniBand architecture specification descriptions
Mellanox Firmware Tools (MFT) User's Manual Document # 2329	The MFT (Mellanox Firmware Tools) package is a set of firmware tools. The manual supplied with this package provides an overview of the firmware its installation and replacement. The MFT can be downloaded with its documentation at: http://www.mellanox.com under "Firmware" downloads.

Online Resources

- Mellanox Technologies Web pages: http://www.mellanox.com
- Dell Support Web pages: http://support.dell.com

Conventions

Throughout this manual, the name M2401G and the term switch are used to describe the 24-port 20Gb/s InfiniBand switch for the Dell M1000e, unless explicitly indicated otherwise.

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InfiniHost®, ConnectX®, and InfiniScale®

Table 2 - Switch Products Covered in this User's Manual

Product Number	Description
M2401G	24 Port 20 Gb/s unmanaged switch including 8 external ports for the Dell M1000e chassis.

This product does not require Advanced Management.

Revision History

Table 3 - Revision History Table

Date	Revision	Description
June 2008	Rev 1.0	First Draft

1 Overview

This *User's Manual* provides an overview of the M2401G 24-port 20Gb/s InfiniBand switch for the Dell M1000e. The switch supports 16 switch ports towards the midplane and 8 external ports. In addition to supporting passive copper InfiniBand cables, the external ports can provide power for supporting active cables and optical cables through the use of media adapters.

The switch supports 16 switch ports towards the midplane and 8 external ports. In addition to supporting passive copper InfiniBand cables, the external ports can provide power for supporting active cables and optical cables through the use of media adapters.

The switch platform comes pre-installed with all necessary firmware, and configured for standard operation with InfiniBand fabric, and requires an InfiniBand compliant Subnet Manager running from one of the hosts. All that is required for normal operation is to follow the usual precautions for installation and connection from the switch to the HCAs or other switches. Once connected, the Subnet Management software automatically configures and begins utilizing the switch.

Maintenance and configuration of the switch is done in-band over the InfiniBand fabric using the Mellanox Technologies InfiniBand Administration (IBADM) tools package. This package provides the ability to upgrade firmware and monitor the temperature, voltage, port utilization, and other status parameters in the switch.

Basic installation, hot-swapping components and hardware maintenance is covered in **"Installation and Basic Operation" on page 8**.

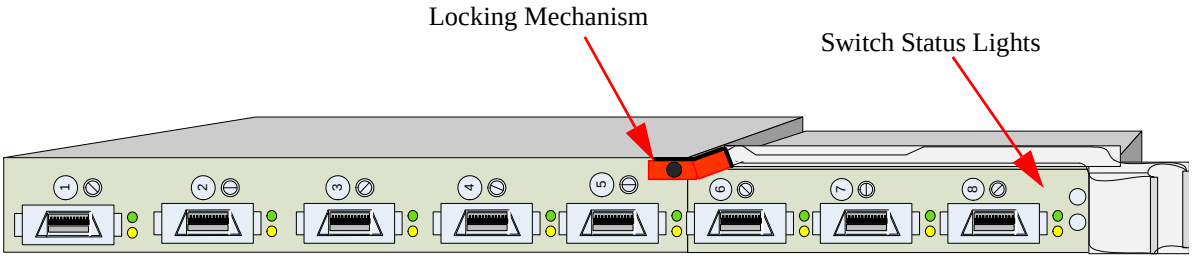
The M2401G switch has a Hot Swap controller and a PSOC Management IC

2 Installation and Basic Operation

2.1 Switch Platform Hardware Overview

Figure 1 shows the front panel view of the switch.

Figure 1: Switch Front Panel and Locking Mechanism



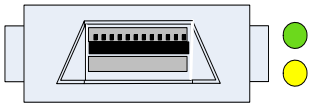
2.1.1 InfiniBand Connectors

InfiniBand connectivity has 8 CX4 microGiGa connectors through the front panel. The remaining 16 interfaces are through the AirMax Midplane Connector out the back of the switch. Figure 1 shows the front 8 ports.

Each of the front panel connectors has two LEDs located next to the connector. The green LED, when lit, indicates that the InfiniBand driver is running and a valid physical connection between nodes exists. The yellow LED when lit, indicates a valid data activity link, this is the logical link. The yellow LED illuminates when the InfiniBand network is discovered over the physical link. A valid data activity link without data transfer is designated by a constant yellow LED indication. A valid data activity link with data transfer is designated by a blinking yellow LED indication. If the LEDs are not active, either the physical link or the logical link (or both) connections has not been established.

Figure 2: Physical and Logical Link Indications LEDs

LED Name
Physical Link - Green
Data Activity - Yellow Blinking indicates Data Transfer Constant on indicates no Data Transfer



2.1.2 Switch Status Lights

The switch Status lights indicate whether the switch is receiving power from the chassis.

Figure 3: Indicator LEDs

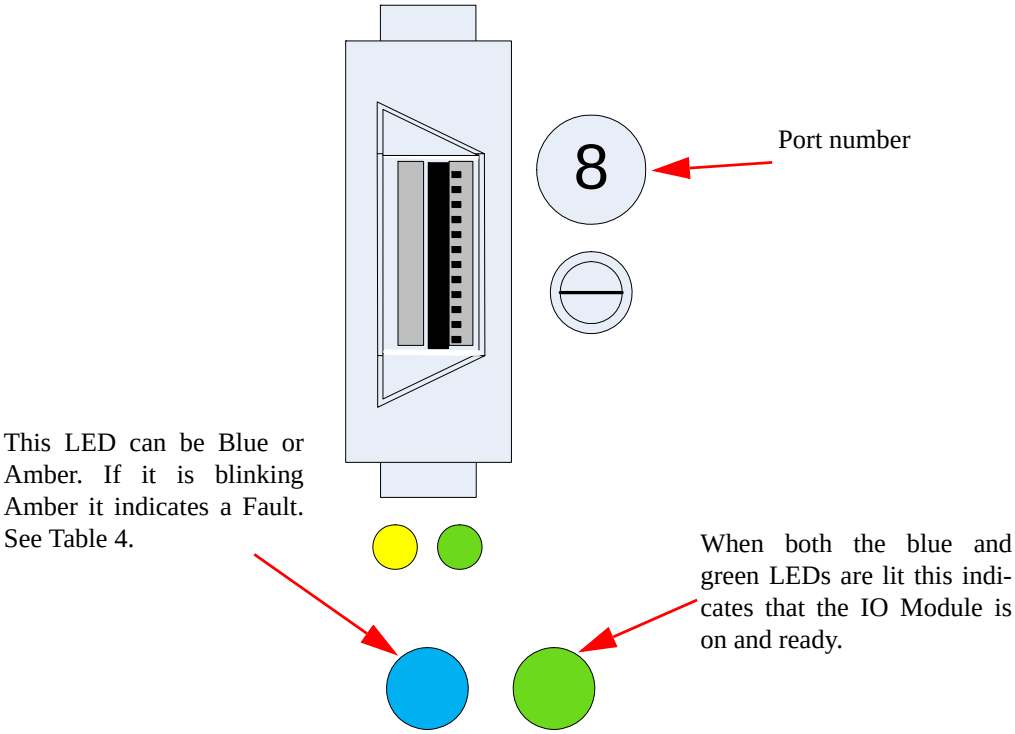

8
Port number
This LED can be Blue or Amber. If it is blinking Amber it indicates a Fault. See Table 4.
When both the blue and green LEDs are lit this indicates that the IO Module is on and ready.

Table 4 - IOM states and LED configurations:

IOM State	Source	LED		
		Blue	Amber	Green
OFF	N/A	OFF	OFF	OFF
BOOT_IN_PROGRESS	IOM	OFF	OFF	ON
NORMAL/ STACK_MASTER	IOM	ON	OFF	ON
STACK_SLAVE Stackable	IOM	OFF	OFF	ON
IOM_FAULT (self-diagnosed)	IOM	OFF	BLINK 1HZ	ON
IOM_FAULT (Misconfig or other CMC-detected fault)	CMC	OFF	BLINK 1HZ	OFF
MODULE_IDENTIFY	CMC	BLINK 1HZ	OFF	ON

2.2 Switch Platform Installation and Operation

Installation and initialization of the switch platform are straightforward processes, requiring attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment. The switch platform does not require any programming or configuration to operate as a basic InfiniBand switch and includes all of the necessary functionality to operate with external standard InfiniBand Subnet Management software.

This section describes the installation process and basic operation of the switch platform. Please first read the warnings sub-section carefully before carrying on with installation procedures.

2.2.1 Installation Safety Warnings

1. Installation Instructions

Read all installation instructions before connecting the equipment to the power source.

2. Over-temperature

This equipment should not be operated in an area with an ambient temperature exceeding the maximum recommended: 50°C (122°F). Moreover, to guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.

3. Stacking the Chassis

The chassis should not be stacked on any other equipment. If the chassis falls, it can cause bodily injury and equipment damage.

4. During Lightning - Electrical Hazard

During periods of lightning activity, do not work on the equipment or connect or disconnect cables.

5. Copper InfiniBand Cable Connecting/Disconnecting

Copper InfiniBand cables are heavy and not flexible, as such they should be carefully attached to or detached from the connectors. Refer to the cable manufacturer for special warnings and instructions.

6. Rack Mounting and Servicing

When this product is mounted or serviced in a rack, special precautions must be taken to ensure that the system remains stable. In general you should fill the rack with equipment starting from the bottom to the top.

7. Equipment Installation

This equipment should be installed, replaced, or serviced only by trained and qualified personnel.

8. Equipment Disposal

Disposal of this equipment should be in accordance to all national laws and regulations.

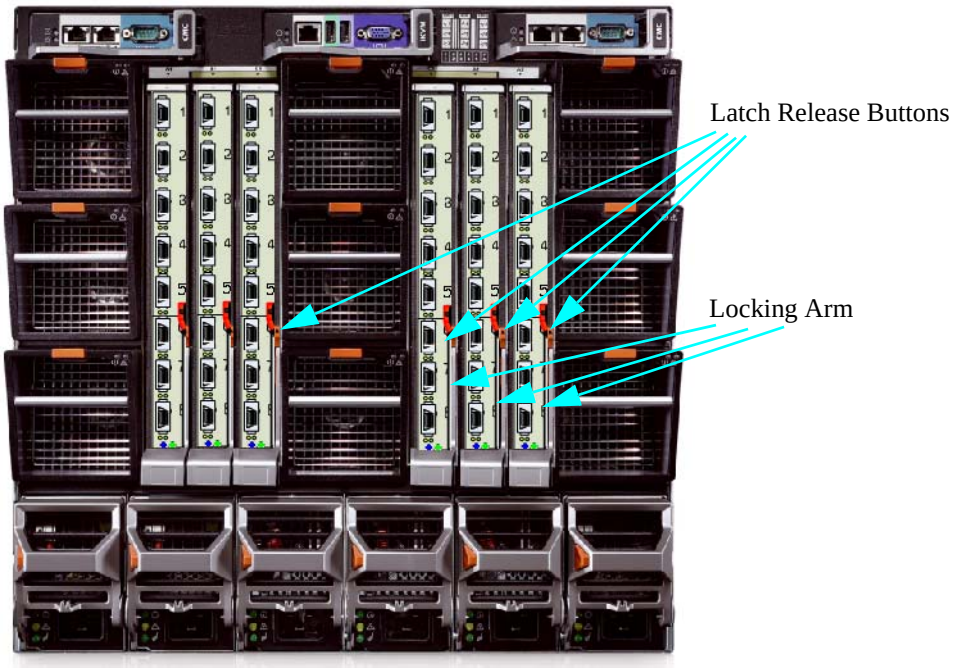
9. Local and National Electrical Codes

This equipment should be installed in compliance with local and national electrical codes.

2.2.2 Mechanical Installation

These switches are hot pluggable. It is not necessary to power down the Dell Chassis to install a new switch or to replace and old switch with a new one.

Figure 4: Rear View of the Dell M1000e Chassis



2.2.2.1 Removing an Old Switch From the Chassis

1. Remove any locking cables or screws that secure the old switch into the chassis.
2. Disconnect all of the cables from the front of the switch to be removed.
3. Unlock the switch from the chassis by pushing the red latch release button.
4. Pull the locking arm down to a position perpendicular to the front of the chassis.
5. Pull the switch out of the chassis using the locking arm.

2.2.2.2 Removing a Blank Cover Plate From the Chassis

1. Remove any locking cables or screws that secure the blank cover plate into the chassis.
2. Unlock the blank cover plate by pushing the red latch release button.
3. Pull the locking arm down to a position perpendicular to the front of the chassis.
4. Pull the cover plate out of the chassis using the locking arm.

2.2.2.3 Installing the Mellanox M2401G Switch Into the Dell Chassis

Note: Make sure the Chassis is stable on a solid floor and that the Chassis is filled from the bottom up. This will keep the center of gravity as low as possible reducing risk of tipping.

Note: IOMs are to be installed from right to left.

1. Follow the instructions in Section 5.2.2.1 or Section 5.2.2.2 to remove an old switch or a Blank cover plate.
2. On the new switch, push the red latch release button.
3. Pull the lever forward until the lever is perpendicular to the front panel.
4. Push the switch into the slot until the latching mechanism is against the bar.

5. Push the lever on the latching mechanism up, making sure that the latching mechanism catches the locking bar. The lever should now be parallel to the front panel.
6. Check the indicator lights to make sure the switch has power.

The installer should use a rack cable to support the mechanical and environmental characteristics of a fully populated switch platform Chassis.

The rack mounting is designed to fit the Dell M1000e Chassis. Take precautions to guarantee proper ventilation for air intake at the front of the chassis and exhaust at the rear in order to maintain good airflow at ambient temperature. Cable routing in particular should not impede the air exhaust from the chassis.

2.2.3 Power Connections and Initial Power On

Caution: The switch platform will automatically power up when AC power is applied. There is no power switch. Immediately upon closing the latching mechanism check to make sure that the Power on to the Switch LED is lit.

2.2.4 InfiniBand Cable Installation

All cables can be inserted or removed with the unit power on. To insert a cable, press the connector into the port receptacle until the connector is firmly seated. The GREEN LED indicator below each port will light when the physical connection is established (that is, when the unit is powered on and a cable is plugged into the port with a functioning port plugged into the other end of the connector). After plugging in a cable, lock the connector using the latching mechanism particular to the cable vendor. The YELLOW LED will light (non blinking indicating that no data is being transferred yet). When a logical connection is made the yellow LED will blink signifying data is being transferred.

To remove, disengage the locks and slowly pull the connector away from the port receptacle. Both LED indicators will turn off when the cable is unseated.

Care should be taken not to impede the air exhaust flow through the fan modules.

Note: Cable lengths should be used which allow for routing horizontally around to the side of the chassis before bending upward or downward in the rack.

2.2.5 InfiniBand Optical Cable Installation

M2401G switches will work with optical cables and media adapters. Insert the media adapter into the connector and then connect the optical cable to the media adapter. Make sure to close any locks on the cables and media adapters. The GREEN LED indicator below each port will light when the physical connection is established (that is, when the unit is powered on and a cable is plugged into the port with a functioning port plugged into the other end of the connector). The YELLOW LED will light (non blinking indicating that no data is being transferred yet). When a logical connection is made the yellow LED will blink signifying data is being transferred.

To remove, disengage the locks and slowly pull the connector away from the port receptacle. Both LED indicators will turn off when the cable is unseated.

Care should be taken not to impede the air exhaust flow.

Note: Cable lengths should be used which allow for routing horizontally around to the side of the chassis before bending upward or downward in the rack.

3 Management Tools Overview

3.1 Updating Firmware

The switch is delivered with the latest Firmware. New firmware versions are issued as development progresses. When new firmware becomes available Mellanox will notify customers, and the new firmware image will be found on the Mellanox firmware download page.

You will need the Mellanox Firmware Tools package to update firmware for this switch. It can be downloaded from:

http://www.mellanox.com/products/management_tools.php

Note: Don’t forget to set the flag for IBspark when you install the MFT kit.

Firmware for this switch can be updated by going to the site below and following the directions for burning new firmware.

The latest firmware can be found at:

http://www.mellanox.com/support/firmware_download.php

4 Troubleshooting

As soon as a switch is plugged in make sure that the power LED is on.

The power LED for the switch does not come on:

If the green Power LED is not on;

1. Check that the chassis has power.
2. Remove and reinstall the switch.

The link LED for the InfiniBand connector does not come on:

1. Check that both ends of the cable are connected.
2. Check that the locks on the ends are secured.
3. Make sure that the latest FW version is installed on both the HCA and the switch.
4. If media adapters are used check that the all connections are good, tight, and secure.

The activity LED does not come on:

Check that the Subnet Manager has been started.

The power LED for the switch shuts off:

1. Check that the there is adequate ventilation.
2. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules are not blocked.

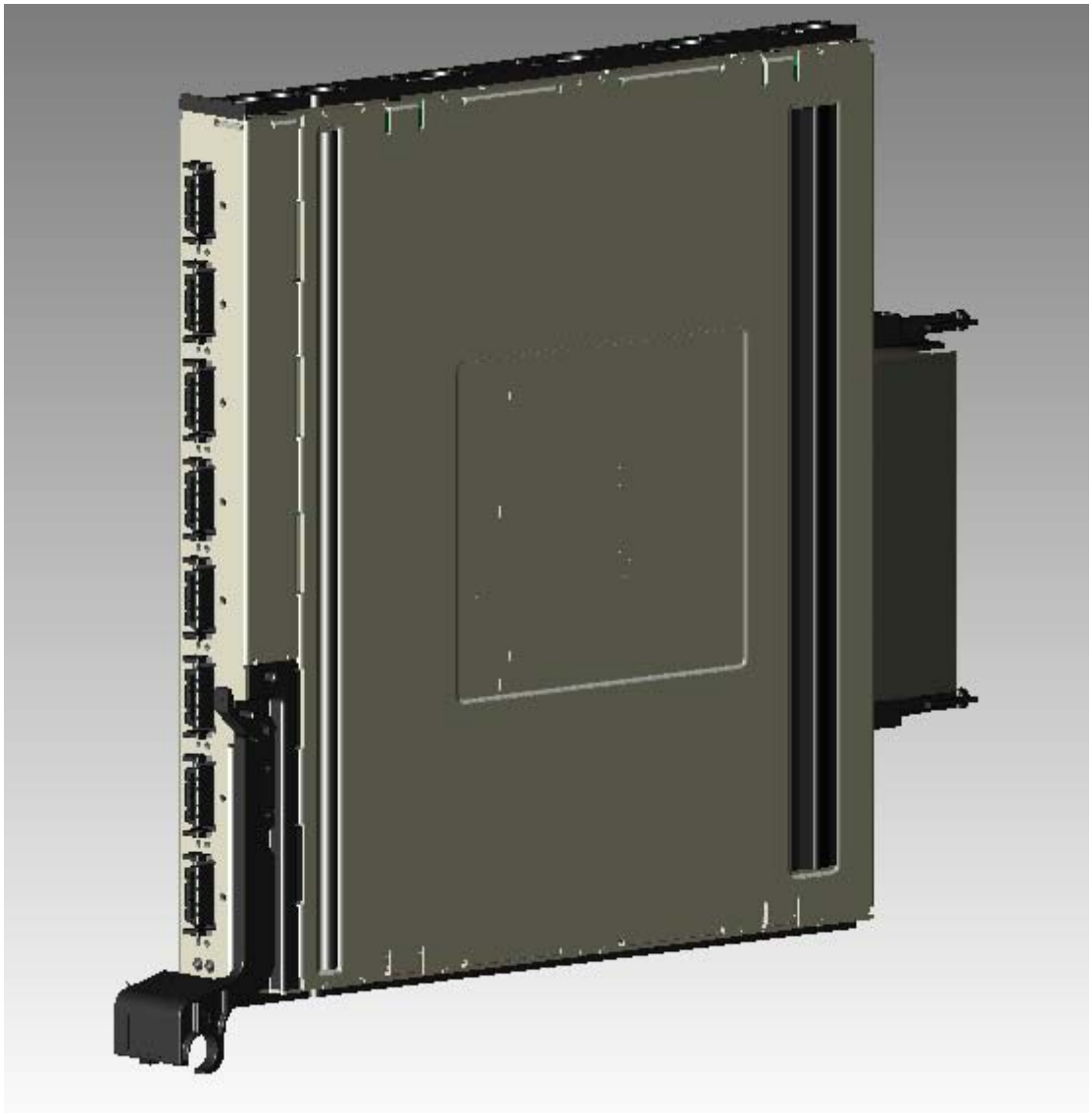
Appendix A: Specification

Table 5 - M2401G Specification Data

Physical		**Power and Environmental**	
Size:	1.16” H x 10.04” D x 10.73” W 29.45 mm X255.20 mm X 272.50 mm	Maximum Power:	50W – M2401G
Weight:	1.5 Kg fully configured	Temperature:	0 to 50 Celsius
Mounting:	Vertically mounted rack	Humidity:	10% - 90% non-condensing
		Altitude:	
Power through:	1W per port	Shock:	
SerDes Speeds	10, 20 Gb/s per port	Vibration:	
Connectors:	microGiGaCN		
Protocol Support		**Regulatory Compliance**	
InfiniBand:	Auto-Negotiation of 10Gb/s or 20Gb/s	Safety	TBD
		CB:	
QoS:	8 InfiniBand Virtual Lanes for all ports	CE:	
		TUV:	
Management:	Baseboard, Performance, and Device management Agents for full InfiniBand In-Band Management	EMC	
Scalability and Performance		**Reliability, Availability and Serviceability Features**	
Switching Performance:	Simultaneous wire-speed any port to any port		
	48K Unicast Addresses Max. per Subnet		
Addressing:	16K Multicast Addresses per Subnet		
Switching Capacity	960 Gb/s		

Appendix B: Mechanical Drawing

Figure 4 Mechanical Drawing of the Switch



Appendix C: EMC Certification Statements

C.1: FCC Statements (USA)

Class A Statements:

§ 15.21

Statement

Warning! Changes or modifications to this equipment not expressly approved by the party responsible for compliance (Mellanox Technologies) could void the user's authority to operate the equipment.

§15.105(a)

Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

C.1.1 EN Statements (Europe)

EN55022 Class A Statement:

> **Warning**
>
> This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

C.1.2 ICES Statements (Canada)

Class A Statement:

"This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada."

C.1.3 VCCI Statements (Japan)

Class A Statement:

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

(Translation - "This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.")

Appendix D: InfiniBand Connector Pinout

Figure 5: InfiniBand CX4 Connector Pinout

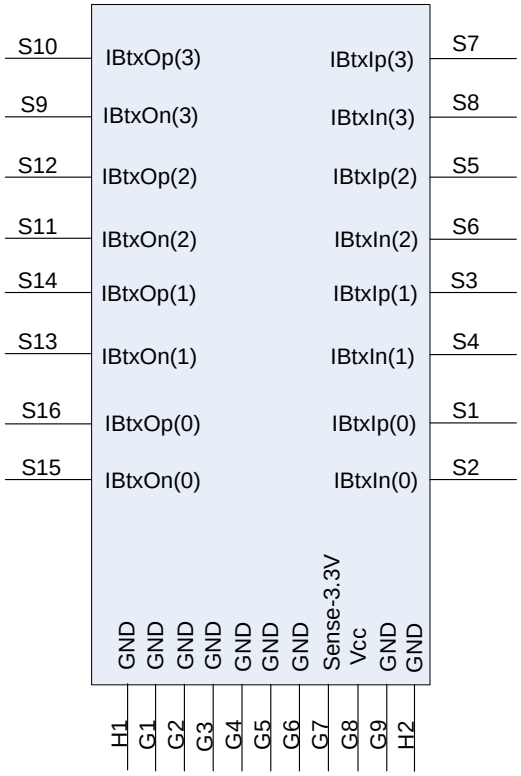


Table 6 - Connector Pin Name and Numbe
Name Correspondence

Connector Pin Number	Connector Pin Name
S1	IBtxIp(0)
S2	IBtxIn(0)
S3	IBtxIp(1)
S4	IBtxIn(1)
S5	IBtxIp(2)
S6	IBtxIn(2)
S7	IBtxIp(3)
S8	IBtxIn(3)
S9	IBtxOn(3)
S10	IBtxOp(3)
S11	IBtxOn(2)
S12	IBtxOp(2)
S13	IBtxOn(1)
S14	IBtxOp(1)
S15	IBtxOn(0)
S16	IBtxOp(0)
G1-G6, G9, H1-H2	Signal Ground
G7	Sense-3.3V
G8	Vcc

Appendix E: Local Authorization Form

국내대리인 지정(위임)서

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	모 델 명	0R449H		
	제 조 자	Mellanox Technologies, Ltd.		
	제 조 국	ISRAEL		

위 본인은 전파연구소의 『정보통신기기 인증 규칙』 제5조 제6항의 규정에 의하여 위 제품에 대한 국내대리인을 아래와 같이 지정(위임)하고자 합니다.

확인일자 : 2008 년 06 월 25 일

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	모 델 명	0U007H		
	제 조 자	Mellanox Technologies, Ltd.		
	제 조 국	ISRAEL		

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